CLAIMS

What is claimed is:

1. A method of modulating expression of an endogenous cellular gene in a cell, the method comprising the step of:

contacting a first target site in the endogenous cellular gene with a designed or selected zinc finger protein, wherein the protein comprises a functional domain;

thereby modulating expression of the endogenous cellular gene.

2. The method of claim 1, wherein the step of contacting further comprises contacting a second target site in the endogenous cellular gene with a second zinc finger protein.

3. The method of claim 2, wherein the first and second target sites are adjacent.

4. The method of claim 3, wherein the first and second zinc finger proteins are covalently linked.

5. The method of claim 1, wherein the first zinc finger protein is a fusion protein comprising at least two regulatory domains.

6. The method of claim 3, wherein the first and second zinc finger proteins are fusion proteins, each comprising a functional domain.

7. The method of claim 6, wherein the first and second zinc finger protein are fusion proteins, each comprising at least two functional domains.

8. The method of claim 1, wherein the cell is selected from the group consisting of animal cell, a plant cell, a bacterial cell, a protozoal cell, or a fungal cell.

9. The method of claim 8 wherein the cell is a plant cell.

10. The method of claim 8, wherein the cell is a mammalian cell

11. The method of claim 10, wherein the cell is a human cell

12. The method of claim 1 wherein the expression of the endogenous cellular gene is repressed.

13. The method of claim 12, wherein the functional domain is selected from the group consisting of unliganded thyroid hormone receptor (TR), v-erbA, Dax, RBP, MeCP2, MBD2B and a DNMT.

14. The method of claim 1, wherein the expression of the endogenous cellular gene is activated.

15. The method of claim 14, wherein the functional domain is ligand-bound thyroid hormone receptor.

16. The method of claim 15, wherein the ligand is 3,5,3'-triiodo-L-thyronine (T3).

17. The method of claim 1 wherein the functional domain is a bifunctional domain (BFD).

18. The method of claim 17, wherein the activity of the bifunctional domain is dependent upon interaction of the BFD with a second molecule.

19. The method of claim 18, wherein the BFD is selected from the group consisting of thyroid hormone receptor, retinoic acid receptor, estrogen receptor and glucocorticoid receptor.

20. The method of claim 18, wherein the second molecule is a protein.

21. The method of claim 18, wherein the second molecule is a small molecule.

22. The method of claim 19, wherein the second molecule is a small molecule.

23. The method of claim 22, wherein the small molecule is selected from the group consisting of thyroid hormone (T3), all-*trans*- retinoic acid, estradiol, tamoxifen, 4-hydroxy-tamoxifen, RU-486 and dexamethasone.

24. The method of claim 1, wherein the method further comprises the step of first administering to the cell a delivery vehicle comprising the zinc finger protein, wherein the delivery vehicle comprises a liposome or a membrane translocation polypeptide.

25. The method of claim 1, wherein the zinc finger protein is encoded by a zinc finger protein nucleic acid operably linked to a promoter, and wherein the method further comprises the step of first administering the nucleic acid to the cell in a lipid:nucleic acid complex or as naked nucleic acid.

26. The method of claim 1, wherein the zinc finger protein is encoded by an expression vector comprising a zinc finger protein nucleic acid operably linked to a promoter, and wherein the method further comprises the step of first administering the expression vector to the cell.

27. The method of claim 26, wherein the expression vector is a viral expression vector.

28. The method of claim 27, wherein the expression vector is selected from the group consisting of a retroviral expression vector, an adenoviral expression vector, and an AAV expression vector.

29. The method of claim 25, wherein the zinc finger protein is encoded by a nucleic acid operably linked to an inducible promoter.

30. The method of claim 26, wherein the zinc finger protein is encoded by a nucleic acid operably linked to an inducible promoter.

31. The method of claim 1, wherein the target site is upstream of a transcription initiation site of the endogenous cellular gene.

32. The method of claim 1, wherein the target site is adjacent to a transcription initiation site of the endogenous cellular gene.

33. The method of claim 1, wherein the target site is downstream of a transcription initiation site of the endogenous cellular gene.

34. The method of claim 1, wherein the zinc finger protein comprises an SP-1 backbone.